Space Weather Forecast

Issued on Saturday, 04 November 2023 at 01:13 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1/G2 Minor/Moderate geomagnetic storms expected on the 5th Nov due to CME (coronal mass ejection) arrival.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low with only common class flare activity in the past 24 hours. There are five numbered and two unnumbered sunspots on the visible disc. The large spot in the southwestern quadrant saw some reduction in its trailing region but still displays some magnetic complexity. The lager spot in the southeast also has only a small trailing region, but signs of increased magnetic complexity visible. The new region near the southeast limb also appears to be magnetically complex, though due to foreshortening the current analysis is low confidence and may see further changes. All other regions are small and simple.

A large filament (arc of plasma) eruption was detected around 03/0430 UTC from the northwest quadrant. Modelling suggest an Earth directed component with an arrival sometime later on the 05 Nov.

Solar Wind / Geomagnetic Activity: Solar wind speeds have been at background levels. Total magnetic field strength has been weak, with the north-south component also varying weakly. Geomagnetic activity was Quiet (Kp 0-1) throughout.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained close to background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate solar activity is expected, with a chance of isolated Moderate flares.

Solar Wind / Geomagnetic Activity: Two CME's (coronal mass ejections) feature in the forecast, one from the 2 Nov which may arrive late 4 or early 5 Nov, and another from 03/0430 UTC which is expected to arrive later on the 05 Nov.

Solar wind speeds are slow currently. The next enhancements expected from CME influence during day 2 (05 Nov), followed by faster solar winds which may enhance solar wind speeds to strong, around 600-700 km/s, from later on day 3 or more likely day 4 (6-7 Nov).

Quiet geomagnetic activity expected initially. Unsettled to Active conditions and a slight chance of G1/Minor Storms possible during the latter part of day 1 (04 Nov) or more likely early day 2 (05 Nov). Later day 2 (05 Nov) G1/G2 Minor/Moderate storm intervals are expected with a chance of G3/Strong storms due to the arrival of the CME from 03 Nov. Days 3 and 4 (6-7 Nov) will likely see geomagnetic activity remain Unsettled to Active due to the expected arrival of a fast solar wind.

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Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to persist at around background with no solar radiation storms occurring.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	80	30	20
Strong	G3	No	1	30	10	1
Severe	G4	No	1	5	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	35	35	35	35
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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